

Quiz 3 Evaluation Guide

Find i_B :

$$-5V + i_B \cdot 1K + 1 + (\beta_F + 1) i_B \cdot 0.79K = 0$$

$$4 = (1K + 79K) i_B \quad i_B \approx \frac{4}{80K} = \frac{1}{20K} = 5 \times 10^{-5} A$$

$$i_C = 100 \cdot i_B$$

Find V_{CE}

$$-5 + i_C \cdot 100 + V_{CE} + i_E \cdot 0.79K = 0$$

$$\begin{aligned} V_{CE} &= 5 - 100 \cdot 5 \times 10^{-5} - 101 \cdot 5 \times 10^{-5} \cdot 790 \\ &= 5 - \underbrace{1 \times 10^4 \cdot 5 \times 10^{-5}}_{\approx 0.5} - \underbrace{79,000 \cdot 5 \times 10^{-5}}_{\approx 4V} \\ &= 5 - \approx 0.5 - \approx 4V \end{aligned}$$

$$V_{CE} = .5V$$

$V \cdot I$

$$\begin{aligned} \text{Power} &\approx .5V \cdot 100 \cdot 5 \times 10^{-5} \\ &\approx .5V \cdot 5 \times 10^{-3} \end{aligned}$$

$$\boxed{\approx 2.5 \times 10^{-3} W}$$

$$2.5mW$$